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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,314	03/01/2004	Ashok Mantravadi	030213	1802

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QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO, CA 92121

EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

us-docketing@qualcomm.com
kascanla@qualcomm.com
nanm@qualcomm.com

Office Action Summary	Application No.	Applicant(s)	
	10/791,314	MANTRAVADI ET AL.	
	Examiner	Art Unit	
	SIU M. LEE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10,13,20,43 and 53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10,13,20,43 and 53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-8, 10, 13, 20, 43, and 53 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 5, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) and Ling et al. (US 6,377,607 B1).

(1) Regarding claims 1 and 20:

Wu et al. discloses a method of transmitting a base stream of data and an enhancement stream of data (bit stream 1 and bit stream 2 as shown in figure 5) in a wireless communication system, comprising:

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the base stream to obtain a first data symbol stream (bit stream 1 in figure 5 is being modulated in the QPSK mod block), wherein the base stream is designated to be received by a plurality of receiving

entities (for mobile receivers could decode a lower quality video signal, paragraph 0059, lines 12-14);

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the enhancement stream to obtain a second data symbol stream (bit stream 2 in figure 5 is being modulated in the QAM mod block), wherein the enhancement stream is designated to be received by at least one receiving entity (for fixed receivers could decode a higher quality video signal, paragraph 0059, lines 12-14), and wherein the coding and modulating for the base and enhancement streams are not dependent on channel realizations of receiving entities for the base and enhancement streams (the coding and modulating for the base (low priority) and enhancement streams (hi priority) does not dependent on the channel realizations of receiving entities for the base and enhancement streams).

Wu et al. fails to disclose (a) processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, and (b) wherein the combining includes time

division multiplexing the first plurality of stream with the second plurality of symbol streams to obtain the plurality of transmit symbol streams.

With respect to (a), Thomas et al. disclose processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams (transmit weighting unit 3A05, the data stream 3A10 is weighted by transmit weighting unit 3A05 and obtain plurality of data stream, column 3, lines 62-63); processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams (at least one data stream 3A10 is process by the second transmit weighting unit 3A05 and obtain a second plurality of data substream as shown in figure 3A), wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams (the weighting unit controller 3A11 may be provided with channel state information 3A12 but not channel realizations of the receiving entities for the base and enhancement stream); and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas (transmit combiner 3A03 combine the first plurality and the second plurality of data substream and transmit by the plurality of transmitting unit 3A01 and antenna 101 as shown in figure 3A).

It is desirable to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; process the second data symbol stream in accordance with a second spatial processing scheme to

obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Thomas et al. with the method of Wu et al. to improve the performance of the method.

With respect to (b), Ling et al. discloses a time division combiner (combiner 16 in figure 1) that mixes the input signals in accordance with conventional time division combining methods (column 6, lines 64-66).

It is desirable to combine include time division multiplexing the first plurality of stream with the second plurality of symbol streams to obtain the plurality of transmit symbol streams because the delay time variance are reduced thereby improving the throughput performance and achieving high quality of service. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the combiner of Ling et al. in the method of Wu et al. and Thomas et al. to improve the performance of the method.

(2) Regarding claim 2:

Wu et al. further disclose wherein the base stream and the enhancement stream are transmitted for a broadcast service (page 5, claim 9 discloses that the bit streams are for tiered digital broadcasting).

(3) Regarding claim 4:

Wu et al. fails to disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or the spatial multiplexing scheme.

However, Thomas et al. further disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme (the transmit antenna in figure 3A may be used to provide various form of spatial diversity including transmit diversity).

It is desirable to have the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme because it can increase the transmission capacity. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Thomas et al. with the method of Wu et al. to improve the performance of the method.

(4) Regarding claim 5:

Thomas et al. further disclose wherein each of the first and second spatial processing schemes is a transmit diversity scheme (the transmit antenna in figure 3A

may be used to provide various form of spatial diversity including transmit diversity, paragraph 0024, lines 3-5).

(5) Regarding claim 43 and 13:

Wu et al. discloses that the system is a multi-carrier system (OFDM system, paragraph 0008-0011).

(6) Regarding claim 53:

Thomas discloses wherein the wireless communication system is a single-carrier communication system (the wireless communication system as shown in figure 3A is a single-carrier communication system).

It is desirable to use a single-carrier communication system but it requires less hardware and reduces complexity. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the single carrier communication system of Thomas et al. to simplify the method.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) and Ling et al. (US 6,377,607 B1) as applied to claim 1 above, and further in view of Kadous et al. (US 2003/0165189 A1).

Wu et al ., Thomas et al. and Ling et al. disclose all the subject matter as discussed in claim 1 except wherein the base stream is coded, modulated, and spatially processed for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially

processed for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR.

However, Kadous discloses wherein the base stream and the enhancement stream are received for a broadcast service (it is inherent that a wireless communication system can be used in broadcasting services), wherein the base stream (the first recovered symbol stream) is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better (the data rates may be selected to achieve a specific overall spectral efficiency with a lower minimum “received” SNR, paragraph 0009, paragraph 0080), and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR (higher effective SNR) (the data rates may be selected with a higher overall spectral efficiency fir a specific received SNR, higher effective SNR, the highest effective SNR is achieved for the last recovered symbol stream, paragraph 0080).

It is desirable to wherein the base stream and the enhancement stream are received for a broadcast service, wherein the base stream is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR because it can achieve high performance when limited information is

available at the transmitter for the MIMO channel. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kadous et al. in the method of Wu et al., Thomas et al. and Ling et al. to improve the performance of the method.

4. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) and Ling et al. (US 6,377,607 B1) as applied to claim 1 above, and further in view of Onggosanusi et al. (US 2003/0210750 A1).

Wu et al., Thomas et al. and Ling et al. disclose all the subject matter as discussed in claim 1 except wherein each of the first and second spatial processing is a space-time transmit diversity (STTD) scheme.

However, Onggosanusi et al. discloses a first space-time transmit diversity (STTD encoder) that process the first data stream and generate the output of x1 and x2 and a second space-time transmit diversity (STTD encoder) that process the second data stream and generate the output of x3 and x4 and then transmit by a plurality of antenna as shown in figure 2c, paragraph 0090, lines 1-4).

It is desirable to process the first and second spatial processing is a space-time transmit diversity (STTD) scheme because it provides a better BER. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Onggosanusi et al. in the method of Wu et al., Thomas et al. and Ling et al. to improve the integrity of the signal.

5. Claims 7, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) and Ling et al. (US 6,377,607 B1) as applied to claim 1 above, and further in view of Kasapi et al. (US 2006/0099955 A1).

(1) Regarding claim 7:

Thomas et al. further discloses that the first spatial processing scheme is a transmit diversity scheme.

Wu et al., Thomas et al. and Ling et al. disclose all the subject matter as discussed except the second spatial processing scheme is a spatial multiplexing scheme.

However, Kasapi et al. discloses a spatial processing scheme that is a spatial multiplexing scheme (spatial multiplexer 66 produce spatial multiplexed signal 68 to be transmitted by a bank of multi-channel transmitter 70 using transmit antenna array 18 as shown in figure 1, paragraph 0028, lines 14-19).

It is desirable to use a spatial processing scheme that is a spatial multiplexing scheme because it improves the signal-to-noise ratio (SNR) and increases throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kasapi et al. in the method of Wu et al., Thomas et al. and Ling et al. to improve the signal integrity of the method.

(2) Regarding claim 8:

Wu et al., Thomas et al. and Ling et al. disclose all the subject matter as discussed in claim 1 except the first and second spatial processing scheme is a spatial multiplexing scheme.

However, Kasapi et al. discloses a spatial processing scheme that is a spatial multiplexing scheme (spatial multiplexer 66 produce spatial multiplexed signal 68 to be transmitted by a bank of multi-channel transmitter 70 using transmit antenna array 18 as shown in figure 1, paragraph 0028, lines 14-19).

It is desirable to use a spatial processing scheme that is a spatial multiplexing scheme because it improves the signal-to-noise ratio (SNR) and increases throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kasapi et al. in the method of Wu et al., Thomas et al. and Ling et al. to improve the signal integrity of the method.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) and Ling et al. (US 6,377,607 B1) as applied to claim 1 above, and further in view of Catreux et al. (US 2006/0029146 A1).

Wu et al., Thomas et al. and Ling et al. disclose all the subject matter as discussed in claim 1 except wherein the combining includes scaling the first plurality of symbol substream with a first scaling factor to obtain a first plurality of scaled symbol substream; scaling the second plurality of symbol substream with a second scaling factor to obtain a second plurality of scaled symbol substream; and summing the first

plurality of scaled symbol substream with the second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams.

However, Catreux et al. discloses the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams (the weighting and combining arrangement 812 in figure 8)

It is desirable to wherein the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams because it allow transmit by multiple antenna and increase the transmit capacity of the system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Catreux et al. in the apparatus of Wu et al., Thomas et al. and Ling et al. to improve the performance of the system.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fan (US 2003/0012315 A1) discloses a system and method for multistage error correction coding wirelessly transmitted information in a multiple antennae communication system.

Wu et al. (US 2007/0036069 A1) discloses an adaptive tie diversity and spatial diversity for OFDM.

Walton et al. (US 2002/0154705 A1) discloses a high efficiency high performance communication system employing multi-carrier modulation.

Medvedev et al. (US 2003/0157954 A1) discloses power control for partial channel state information (CSI) multiple-input, multiple-output (MIMO) system.

Walton et al. (US 2003/0128658 A1) discloses a resource allocation for MIMO-OFDM communication systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Siu M Lee/

Examiner, Art Unit 2611

8/29/2008

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611